

(15)

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

MARCH 27, 1944



X-ray Giant

See Page 200

A SCIENCE SERVICE PUBLICATION

Do You Know?

Pecan shells are used to make activated charcoal for gas masks.

Peruvian wild *tara bushes* are now furnishing an extract used in tanning leather.

If *match sticks* were shortened a quarter of an inch 380 carloads of lumber would be saved in a year.

Boneless beef shipped to our armed forces overseas reduces shipping space by 60%, and the bones left increase the available fertilizer supply.

Burning off *grazing land* in the early spring causes fire injury to grass roots and seed crowns and may decrease the amount of summer feed very seriously.

The first lighted *airways* for night flying have just been opened in Mexico, and clipper service from Los Angeles to Mexico City and beyond to the south and east, is now operating on a 24-hour basis.

Access roads will be constructed by the U. S. Forest Service to 97 now inaccessible timber sections where 15 billion board feet of lumber may be obtained for war purposes, all in western mountain country.

Castor-bean growing will be greatly increased in 1944, with some 3,000,000 pounds of seed expected to be produced this season from 10,000 acres in eight Midwestern states under a federal government plan.

Question Box

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PUBLIC HEALTH

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The death rate of hogs from *cholera* is one-fifth of the rate 20 years ago, but cholera is still number one enemy of hog owners.

"Marsh rabbit" in the meat market is *muskrat*; it is excellent eating if the musk glands are removed when the animals are dressed.

Small fishes that rid cattle of insect parasites on their bellies when the cattle enter streams to drink are reported by scientists and travelers.

A basic unit of 100 *Army vehicles* shipped overseas requires a spare-parts shipment of 35,000 pieces weighing 20 tons.

Clay, used even in prehistoric days, has been more generally used than any other of the natural materials in the earth's crust.

Gray squirrels have been observed chipping the loose bark on white oak trees and eating the geometrid caterpillars found under it.

SCIENCE NEWS LETTER

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ENGINEERING

Film Protects Radio

Immersion in vapor provides invisible armor to protect radio insulators against moisture. Nine times as effective as customary waxing. Numerous uses proposed.

► ACHILLES was made impenetrable to hostile weapons because he had been dunked in the River Styx. An even more impressive (and useful) kind of invulnerability has been produced in the General Electric research laboratories, in which wetness is the hostile weapon and immersion in a mere vapor provides the invisible but impenetrable armor.

One of the toughest problems faced by radio engineers working for our armed forces has been water getting into the porcelain insulators. When that happens, they don't insulate any more, and the set weakens—even stops working altogether. Usual practice has been to treat the insulators with wax; but that is rather impermanent.

Dr. Winton I. Patnode, research chemist, has developed a new treatment for these insulators that is said to be about nine times more effective than waxing them, and with permanent results that defy heat, chemical solvents like gasoline,

naphtha and carbon tetrachloride, and long exposure to ordinary weather.

Objects treated with it simply won't let water wet them. If moisture precipitates on them, it remains rounded up as small droplets, and the wide dry spaces between continue to defy the electricity to pass.

The process is quite simple, but as yet not at all well understood. The objects to be made water-repellent are simply placed in a closed cabinet, and the vapors of one of a group of substances known chemically as the methyl chlor silanes are flooded on them. An after-treatment with ammonia vapor is sometimes desirable, to neutralize corrosive acids that may collect during the moisture-proofing.

Dr. Patnode has been unable to demonstrate the presence of a tangible film on his treated insulators, either with chemical reagents or examination with a high-power microscope. Yet their be-

havior shows that they are wearing "invisible raincoats."

Numerous other uses are proposed for the new wet-refusing films, most of which must remain undisclosed for the present.

One such use, however, promises to make life in the laboratory a lot happier. Everybody has noticed how water rises in a slight curve where the edges of its surface come into contact with the tube or vessel containing it. This curve, called the meniscus, makes it hard to read gauges, glass measuring flasks and other laboratory vessels that require highest possible accuracy. If the inside of the glass is given this water-repelling film, the meniscus does not form and the surface is perfectly flat, making readings far easier to take.

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MEDICINE

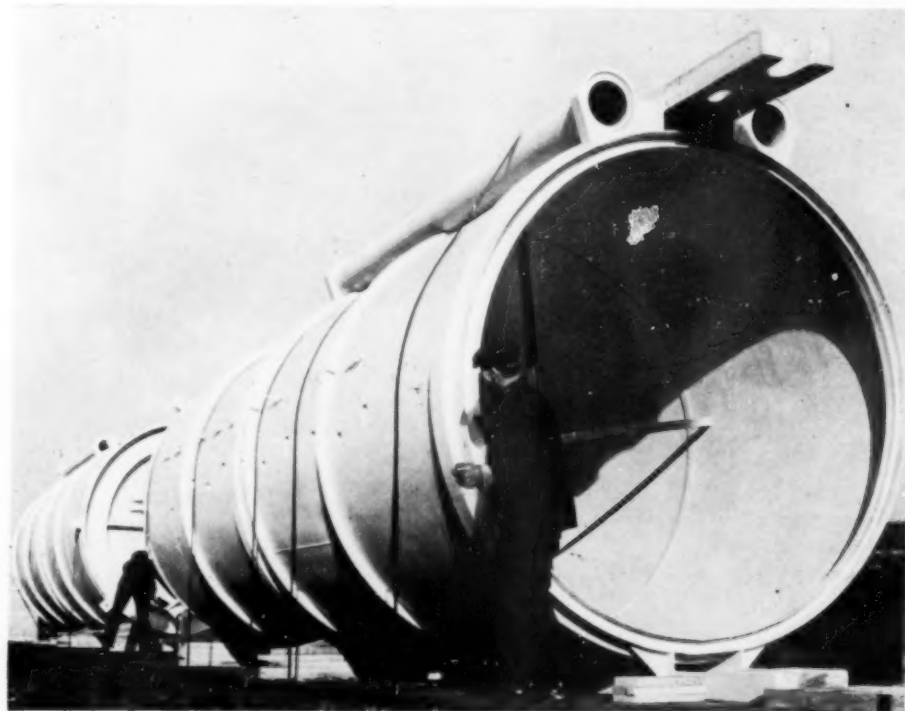
New Operation for Repairing Torn Nerves

► A NEW operation for repairing injured nerves is reported by Dr. David Bodian, of the Poliomyelitis Laboratory, Johns Hopkins University (*Journal, American Medical Association*, Feb. 27).

The operation was designed for cases in which there is a large gap between the ends of a nerve that has been cut by accident or other injury. Such gaps are too large for the nerve itself to close by putting forth new nerve tissue and surgeons have heretofore used other methods in attempting to fill the gap. Transplanting a piece of nerve has been one such method.

Dr. Bodian has devised a "sliding sleeve extension" for closing such gaps in torn nerves which has advantages over other methods of nerve repair. The sleeve is made by freeing the nerve sheath and underlying outer bundles of nerve fibers from one stump of the cut nerve. This sleeve is then drawn up to meet the other stump of the cut nerve and attached to it by surgical stitches. New nerve fibers growing from both ends of the cut nerve are protected by this sleeve of nerve sheath from injury by other tissues that might encroach on them and have a favorable environment in which to grow and unite.

The operation should be performed early if possible in injuries to large nerves, Dr. Bodian states. So far he has only used it on monkeys but the early results suggest that functional recovery will follow about as rapidly as with nerve grafts. Several animals who had



TOUGHENERS—In these seven-ton furnaces built by Westinghouse Electric and Manufacturing Co., gun barrels will be hardened and tempered. These shells will later be lined with brick and equipped with chrome-nickel alloy heating elements to produce 1650-degree temperatures.

this operation were able as a result to move their toes again three to four months after loss of about an inch of a large nerve in the leg.

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MEDICINE

Empyema Remedy Found In Disinfectant and Detergent

► EXCELLENT CLINICAL results in the treatment of empyema (a serious chest infection) have been achieved by a combination of the disinfectant azochloramid, and the synthetic wetting agent, sodium tetradecyl sulfate, Dr. Orville Wyss, of Wallace and Tiernan Products, reported at the meeting of the New York Bacteriologists' War Research Projects Group.

Synthetic wetting agents or detergents are generally known to the layman as soap substitutes. Their effectiveness against bacteria, or germs, is due to their property of concentrating around the bacterial cells and bringing about a disturbance of the electric charge distribution on the cell wall. This disastrously upsets the vital chemical processes of the germs.

The wetting, penetrating and pus-dispersing properties of these soap substitutes or synthetic detergents can be used in the treatment of infected wounds by combining them with antiseptics, Dr. Wyss stated. Many other practical applications of such combinations, he added, suggest themselves in other fields besides medicine.

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INVENTION

Safety Hand Truck Invented For Moving Explosives

► A SAFETY hand truck for moving explosives about in arsenals and factories is the subject of patent 2,309,145, granted to J. E. Turnock of Riverton, N. J., and J. E. Kirk of Philadelphia. It mounts an easily and cheaply replaceable wooden box body on a low-slung metal frame, rolling on rubber tires. Except for the shielded steel axle, all metal parts are of brass or other metal that will not strike sparks. Even the hub caps are carefully made of brass. Rights to manufacture and use, without royalty, are ceded to the government.

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Mate (pronounced mah-tay) brewed from the leaves of the mate tree is used by 12,000,000 South Americans instead of Chinese or India tea.

AGRICULTURE

Wallace Visits Institute

Inter-American research program expected to improve production of rubber, cinchona, tropical fruits and other crops. Vice President sees increase in natural rubber.

► RUBBER, cinchona, tropical fruits and many other crops of importance to America in both war and peace are expected to benefit by research at the new Inter-American Institute of Agricultural Sciences at Turrialba, Costa Rica, which was dedicated on the occasion of Vice President Henry A. Wallace's visit there.

As Secretary of Agriculture, Mr. Wallace was greatly interested in the promotion of agriculture in the American tropics, as a means for providing the countries to the south with products which would supplement, rather than compete with North American agriculture, and thus afford a substantial basis for the "good neighbor" program.

At Turrialba, the Costa Rican government has provided 1200 acres of the finest upland soil to be found in the American tropics. Formal title was transferred to the Institute late last month, although initial phases of actual field work had already been in progress for some time. This locality, at 2,000 feet above sea level, was chosen because less than two hours' ride by car or train can carry the investigator through an almost complete cross section of tropical American conditions.

Scientific work at the Institute is to be entirely research on the post-graduate level; no undergraduate courses are contemplated. Facilities of research stations in other Latin-American countries have already been made available. Until the war is over, only temporary buildings will be erected; however, plans for the permanent plant are already drawn up, and construction can go forward rapidly once materials and manpower are released.

Research is already in progress at the Institute on rubber, cinchona, foodstuffs and tropical hardwoods. Work will begin soon on plants providing oil, fibers and insecticides.

At a press conference immediately before taking off, Vice President Wallace expressed the liveliest interest in the plant breeding program to be carried on there, especially in the breeding of rubber trees of higher productivity and greater resistance to disease. He expressed the opinion that "Plant breeders have

been making, and can and will make, as rapid progress in increasing production of natural rubber as chemists can make in the production of synthetic."

Director of the new Institute is Dr. Earl N. Bressman, formerly with the Coordinator of Inter-American Affairs. Secretary is José L. Colom, of the Pan American Union.

From Costa Rica the Vice President and his party will proceed to Panama, thence southward for visits in Chile, Bolivia, Peru, Ecuador and Colombia, returning to Washington late in April.

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INVENTION

Dornier Seaplane Design Has No Wing Floats

► A SEAPLANE that dispenses with wing floats, source of much trouble, is the subject of newly issued U. S. patent 2,311,161, granted to Claude Dornier of Friedrichshafen, Germany, one of the boldest and most prolific of airplane designers.

Wing floats of present types, Herr Dornier explains in his preamble, are nuisances in the air because of the extra drag which they occasion, and create difficulties on the water by causing disagreeable and sometimes dangerous rocking. He gets rid of them entirely by creating a sharp "elbow" in each wing, and causing the plane to rest on these when it is down, like a huge aquatic bat.

The wings' roots spring from high up on the hull, so that technically the craft is a high-wing monoplane. However, they immediately arch sharply downward, so that at a point about one-third of their length they are practically at a level with the bottom. Here they bend upward again, creating the aforementioned "elbows" which serve as floats. Landing wheels can also be pivoted at this point, folding upward into the wing-roots when the plane is in flight.

Herr Dornier's patent, which was applied for in 1938, is vested in the Alien Property Custodian for the duration.

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MEDICINE

Spread of Ills Predicted

Tropical diseases may be carried over post-war world by dispersing armies and migrating peoples. Air transport increases danger. Sanitation a defense weapon.

► A WORLD-WIDE spread of tropical diseases can be expected after the war, Col. Thomas T. Mackie, of the Army Medical College, declared at the National Conference on Planning for War and Postwar Medical Services held in New York under the auspices of the Carlos Finlay Institute of the Americas.

The present war, Col. Mackie said, is unlike any in history in the enormous potential hazard of disease to which populations may and probably will be exposed. The peak of the hazard will come after the war as armies that have become reservoirs of disease return home and as masses of people in oppressed and disease-ridden countries emigrate.

Besides furnishing food and clothing to relieve malnutrition, semi-starvation and destitution, the United Nations will be faced with the "imperative need for the effective control and treatment of disease" in occupied nations, Col. Mackie said.

Public health practice and the practice of clinical medicine will be affected in many parts of the world, Col. Mackie declared, by the expected extensive migration of tropical diseases.

Tropical diseases do not stay in the tropics because of the climate, he explained. Malaria can and does occur in

such far northern regions as Canada and the British Isles. Even such a strictly tropical disease as filariasis, popularly known as elephantiasis, has existed near Charleston, S. C.

Sanitation and personal hygiene are more important than climate in keeping these diseases out of temperate regions. But they can spread wherever mosquitoes, ticks or other insects that carry the germs exist, and many kinds of insects capable of carrying tropical disease germs are widely prevalent all over the world. Other kinds, never before known to carry these germs, may acquire that ability, Col. Mackie pointed out.

Constant air transport between widely separated theaters of war may accidentally spread widely both the disease-infected persons and the mosquitoes or other carriers of the disease.

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Refugee Doctors Idle

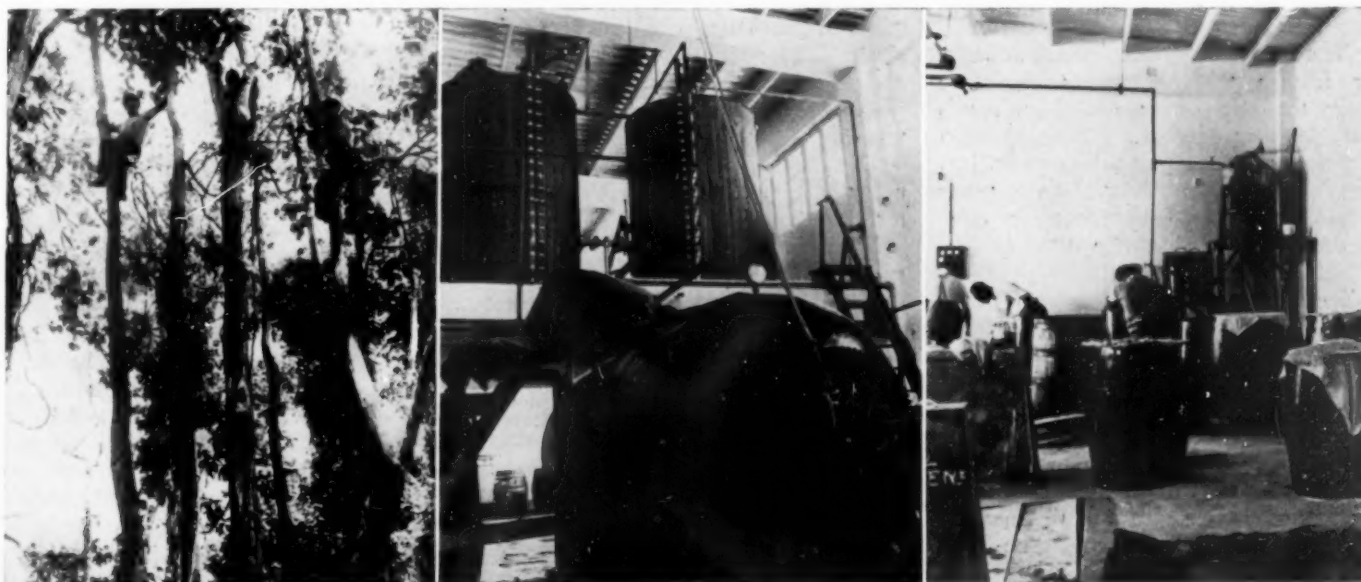
► A PLAN for meeting the present shortage of doctors by having the War Manpower Commission issue special type temporary licenses to refugee physicians was suggested at the National Conference on War and Postwar Planning for Medical Services.

The suggestion was made on an unofficial and personal basis by Dr. Frederick P. Keppel, director of the Equitable Life Assurance Society of U. S., who is now in Washington serving on the War Relief Control Board and also on a two-man board of appeals on immigration visas for refugees.

The postwar practices of American doctors now serving their country with the armed forces would be safeguarded, according to Dr. Keppel's plan, by making these special licenses good only for the duration of the present emergency. The licensees, furthermore, would be limited to practice in certain localities such as the towns that have mushroomed around war industrial centers and army training camps.

The American people are ignorant and uninformed on the immigration problem at the present time, Dr. Keppel declared. (Turn to page 198)

QUININE PRODUCTION — *Natives are shown (extreme left) stripping quinine-laden bark from cinchona trees. After being ground, the bark is placed in the digester at a crude South American extraction plant (center) and mixed with oil and lime. Quinine, the anti-malarial so badly needed by the armed forces, leaves the bark and dissolves in the oil. At the rear of the photograph, two vertical tanks are shown where quinine is transferred from the oil to a water-acid solution. Placed in settling barrels (right) the quinine then separates out and is collected for drying.*



They are still laboring under the impression that hordes of unwashed, illiterate people are clamoring at the gates. Actually, Dr. Keppel said, if every application for a visa were granted, the number would be only one-tenth that allowed under pre-war immigration quotas. Only about one-half of the number is approved and only about half of these get to this country.

The immigrants today are to a large extent people of culture. A large proportion is made up of professional people, such as doctors, dentists, nurses and research workers. Dr. Keppel's suggestion for temporary, special type licenses for the doctors was made with the hope of helping to solve the problem of how to use these refugees to the best advantage of the United States and still protect the jobs of those Americans away at war.

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ENGINEERING

Dream Refrigerator

Touch of a button will open the door of future refrigerator for post-war housewives. Ice cubes will be automatically released.

► **TOUCH OF A BUTTON** may open a post-war household refrigerator that will provide automatic defrosting, zero chamber for frozen foods, ice cubes automatically released, ice water from a faucet and other revolutionary devices. These practical possibilities are offered by Glenn Muffly of Springfield, Ohio, in a report to the American Society of Refrigerating Engineers.

The door-closing rhumba will no longer feature the housewife's departure from the refrigerator with both hands full. Neither need she fumble to open the door while putting things away. Just touch a button with your elbow to make the door automatically open or close is the idea worked out in detail by Mr. Muffly.

Besides throwing away the door handle, the hinges can be so thoroughly concealed, he declares, that you couldn't hang a spider web on one.

Inside there should be a separate compartment for the frozen foods which will be much more popular after the war. This cubic foot or two of "freezer" space will have a separate thermostatic control. Ice cream, fish and frozen foods will be cooled whenever temperature

Japs May Spread Malaria

► **THE JAPS** as they retreat may introduce malaria mosquitoes into the areas our troops will occupy and which are now free of malaria, Prof. Henry E. Meleney, of New York University College of Medicine, declared at the meeting.

Not all the territory in the Pacific theater is malarial. The Pacific isles which were mandated to Japan after the last war are all entirely free from malaria mosquitoes, Prof. Meleney pointed out.

It is possible, he said, that these mosquitoes may deliberately be brought into the islands by the Japs as they leave. The Japs have been accused of similar tactics in the past, specifically of dropping plague-infected rat fleas into China.

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The post-war refrigerator might even provide the warm, dry storage space, needed for such things as crackers and breakfast food, by utilizing waste heat from the condensing unit.

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MEDICINE

Blood Plasma Successful Fighting Shock from Fever

► **SUCCESSFUL** use of blood plasma to fight shock from fever treatment for gonorrhea is reported, apparently for the first time, by Lieut. Arthur M. Pruce, chief of the section of physical and fever therapy at Stark General Hospital, Charleston, S. C. (*Journal, American Medical Association*, Mar. 20).

Lieut. Pruce explains that he is reporting this use of plasma "because our armed forces have instituted a rapidly expanding program of fever therapy to treat venereal diseases" and shock is one of the more dangerous complications of this kind of treatment.

Rise in the pulse rate and fall in blood pressure, indicating impending collapse, forced discontinuance of the fever treatment after about five and one-half hours in the case Lieut. Pruce reports. In spite of treatment with the usual antishock measures, the patient went into shock six hours after the fever treatment was discontinued. At this point about one-half a pint of blood plasma was injected into the patient's vein. Within 20 minutes the patient recovered from the shock condition.

"Interestingly enough," Lieut. Pruce adds, "the patient was cured of gonorrhea in spite of only five and three-quarters hours of therapeutic fever."

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INVENTION

British Armored Vehicle At Home on Land or Sea

► **A KIND** of steel hippopotamus, able to get around in water, through swamps, and on solid ground, is the invention offered by two Englishmen, G. M. Gibbs and T. R. Tusting of London, for patent 2,309,947. Armored, it might serve as a means for taking commandos over the narrow seas, up the beach and right on inland. The boat (if that's what you want to call it) has tractor treads for soft-ground maneuvering, and wheels for moving more rapidly over roads or hard terrain.

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PSYCHIATRY

Recipe for Peace

To prevent future Munichs and future wars, psychiatrist would turn control of Germany over to those who have been the victims of paranoid leaders.

► TO ACHIEVE lasting peace and to prevent future Munichs and future wars requires revolutionary and widespread changes in education. This sums up the mental planning for peace which psychiatrists and psychologists have been doing at the meeting of the American Orthopsychiatric Association.

"The century of the common man must become a century of education," Dr. Franz Alexander, of the Institute for Psychoanalysis, Chicago, declared.

Teach people everywhere to recognize paranoid trends in others and never again "could the fantastic thought of appeasing a paranoid trend be a method of meeting an incipient paranoid war, in the name of peace," Dr. Richard Brickner, of New York, declared.

German culture, he pointed out, has long been dominated by paranoid customs and paranoid ways of thinking. The United Nations will deal more successfully with post-war Germany this time if they put into power the non-paranoid component of German culture.

"Paranee" is the term Dr. Brickner has coined for the victims of persons with paranoid trend. The latter are not persons sick with paranoia, but are the chronically sulky and disagreeable, self-important people who are quick to sense insults, suspicious and inclined to shift all responsibility for themselves onto others. Their longing to dominate every situation, to be always right, shows through their whole nature and comes out in hostile attitudes and aggressively destructive behavior which at its climax sometimes results in murder—or in war.

These people may show charm and wit and other friendly qualities which they use to further their ends, and though suspicious of everyone they can unite with each other to achieve a common goal as, for example, the glorification of Germany. The commonsense well-meant efforts of friends, relatives and doctors to help them, or the efforts to appease them made by men of good will are bound to fail, Dr. Brickner declared. The reason is that the paranoid is not concerned with the particular thing he is demanding at the moment. If you give him that, he still finds fault with

you and makes another demand.

The "paranee," the victim of the paranoid, is the one to be treated, not the paranoid, Dr. Brickner stated. The paranee must learn to recognize the paranoid trend and to refrain from responding as the paranoid expects him to.

Dr. Brickner's remedy for handling post-war Germany is, first, to dispose of the actively paranoid by a variety of methods, then to put in power the paranees, abolish all institutions that have kept the paranoid attitude going so long, and finally to teach new generations of Germans history of the last century, especially German history, and the social sciences in such a way as to include knowledge of paranoid behavior.

Going further than this in mental planning for lasting peace, both Dr. Brickner and Dr. Alexander said that education of the future must be along psychologic and psychiatric lines.

Just as natural sciences and technology played a part in the education during the last century of the machine, psychology must play a part in education in the century of the common man, Dr. Alexander said.

Dr. Brickner suggested using psychoanalytic teaching in the schools to give children everywhere fundamental knowledge of human instincts and feelings and motives instead of hushing such knowledge in early years and letting it seep through only gradually with the disillusion of adolescents.

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ENGINEERING

Westinghouse Researcher Given Lamme Medal

► DR. JOSEPH SLEPIAN, associate director of research, Westinghouse Electric & Manufacturing Company, has been awarded the 1942 Lamme medal of the American Institute of Electrical Engineers, for his development of circuit interrupting and rectifying apparatus. The medal will be presented at the society's national meeting in June.

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FUTURE FURNACE — This ultra-modern streamlined furnace is fed soft coal by the bucketful. Combustion without smoke is claimed among other advantages.

ENGINEERING

Furnace of Future Burns Soft Coal Without Smoke

► SAVING fuel and giving a more even heat, the furnace of the future developed at the University of Illinois can burn soft coal without smoke, Prof. Julian R. Fellows announced.

Ceramic tiles replace the strategic alloy metal ordinarily used for grates and fire box linings.

Stoking is simplified by dumping coal in by the bucketful through the firing door which is placed at an angle leading down to the fire pit, as shown in the photograph on this page.

Smoke must pass through glowing coals, where it is burned, resulting in a saving of heat; only the smokeless burned gases escape up the chimney. A special vent supplies pre-heated air that improves combustion efficiency.

The improved furnace is housed in a smooth streamlined casing, easy to keep clean. Other features include an automatic temperature control and automatic draft compensator.

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The most reliable victory garden fertilizer is barnyard manure; it adds fertility and improves the physical condition of the soil.

MEDICINE

Blast Injuries in War May Cause Clot on Brain

► **BLAST INJURIES** from the concussion effect of a nearby shell, bomb or underwater explosion may cause a blood clot on the brain that would relegate the victim to chronic invalidism or discharge from the service as a case of war nerves, Lieut. Comdr. Walter D. Abbott, Lieut. Floyd O. Due and Lieut. William A. Nosik, of the U. S. Naval Reserve, report. (*Journal, American Medical Association*, Feb. 27.)

The condition is unlike that likely to be found in injuries sustained in civil life and may be overlooked unless physicians and surgeons are watching for it, the Naval surgeons warn.

An operation to remove the blood clot or the accumulation of spinal fluid in the space between the brain and its outer covering membrane remedies the condition. The patient may be out of bed on the third day after operation and may return to active duty within six to eight weeks.

"We have observed a number of blast injuries sustained in action," the surgeons report. "They are the result of injury by a nearby exploding bomb on ship or land or may be the result of a concussion wave subsequent to a sinking ship or a depth bomb while the patient is in the water."

The victims lose consciousness for a few minutes or a few days after the concussion. They have persistent headaches, which are worse at night or when they exert themselves. Their memory is poor and they are irritable and unstable. They may have slight facial palsy. When the blood clot or accumulation of fluid on the brain is suspected, careful neurologic and psychiatric examination will make the diagnosis clear.

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CHEMISTRY

Yellowing of Paper Not Due to Light as Supposed

► **YELLOWING** of papers is not directly due to light as commonly supposed, but to heat and old age, experiments by Dr. H. F. Launer and W. K. Wilson of the National Bureau of Standards show.

All lignin-free papers, even yellowed sheets 250 years old, became whiter when exposed to light. Newsprint, which contains lignin, is about the only kind that

the light rays discolor.

Under war conditions, however, many other kinds of paper may be expected to turn yellow from light. Use of chlorine for treating papers has been restricted and not all the lignin is being removed from paper fibers.

Stability tests on various kinds of paper when exposed to light, revealed that new cotton rag was the most stable, followed in order by refined sulfite paper, old cotton rag, soda-sulfite mixtures and newsprint. Deterioration of newsprint was greatly reduced by neutralizing it with baking soda.

The print that you are reading also protects the paper from the effects of light, the scientists discovered.

Experiments were conducted at average room temperature and humidity with the light source simulating daylight passing through a glass window.

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POPULATION

Baby Production Up Since Start of the War

► **LATEST** note on the war's effect on production at home appears in a Metropolitan Life Insurance Company report of a sudden upswing in baby births in September and October, 1942.

This "evidently reflects the outbreak of the war with the Pearl Harbor episode in December of the preceding year," the editor of the company's Statistical Bulletin comments.

The usual spring and summer peak in baby births was wiped out by the war, it appears from data now available on births each month for five large cities, New York, Boston, Baltimore, Washington, D. C., and New Orleans. Monthly figures are not yet available for the entire nation.

The daily average of births in these cities shows a strong upward movement beginning about September, 1942, and continuing almost unbroken to the end of the year, with no sign of any arrest in the upward trend. In December the figure for these cities was almost 80% above that for the same month in the period 1938-1939.

Expressing natural curiosity as to whether the upswing in births in the last months of 1942 will continue into the early months of 1943, the editor points out that "the recent very high level of the birth rate can obviously not continue very long under present war conditions."

Science News Letter, March 27, 1943

IN SCIENCE

ASTRONOMY

Unseen Stars Discovered By Disturbing Effects

► **DISCOVERY** of two small unseen bodies by their disturbing effect on the visible components of double star systems has been announced by Dr. K. Aa. Strand of the Sproul Observatory, Swarthmore College, Pennsylvania. Dr. Strand, who recently announced the discovery of the first inter-stellar planet in the binary system of 61 Cygni, finds that these new objects are faint stars of small mass, rather than planets.

As in the discovery of 61 Cygni C, detection of the invisible components through the use of photographic observations much higher in accuracy than the usual visual micrometer measures.

One of the faint components found in the system of the star Mu Draconis is a yellow dwarf star with a mass equal to six-tenths that of our sun. Its presence was revealed through the wavy motion, 3.2 years in length, of one of the visible components.

The other object is in the system of Xi Bootis, as shown by an irregularity of 2.2 years. The mass of this faint star is only one-tenth that of the sun, or about 100 times that of Jupiter.

Science News Letter, March 27, 1943

PHYSICS

Giant X-ray Machine Nears Completion; Has War Uses

See Front Cover

► **THE** giant 130-ton electron accelerator being built in the General Electric Research Laboratory is now nearing completion. It will generate X-rays up to 100,000,000 volts.

Evaluation of such high voltage X-rays for the examination of thicker metal sections than can now be studied by means of X-rays, will be one of its most important war functions.

The lower part of the huge alternating current magnet is shown on the cover of this week's **SCIENCE NEWS LETTER**. It is made of slabs of steel spaced apart for cooling.

Science News Letter, March 27, 1943

CE FIELDS

CHEMISTRY

Radio Waves Spot Weld Lumber with Special Glue

► SPOT WELDING with glue increases supplies of usable lumber through a new high-frequency radio process announced by chemists of I. F. Laucks, Inc.

Much narrow waste stock, produced when logs are squared off, can now be economically joined into wide boards for which there is a big war demand. A special cold-setting type of glue, developed by the chemists, is smeared along the edges of the boards. Then heat produced by high-frequency radio waves sets the glue in spots about 18 inches apart.

The new method employs only momentary pressure, eliminates clamping and does away with heating the whole glue line.

General setting of the glue line takes place after the boards have been stacked, thus cutting down the time the boards must be in the gluing machine.

Former methods of utilizing narrow stock were complicated by hand methods or expensive machinery. Availability of the high-frequency radio equipment for the new process is now dependent, however, on approval by the WPB priority division.

Science News Letter, March 27, 1943

ASTRONOMY

Dr. Harlow Shapley Heads Group to Honor Copernicus

► DR. Harlow Shapley, director of Harvard Observatory and president of the American Academy of Arts and Sciences, has accepted chairmanship of a national committee now being formed to facilitate plans for commemoration of the 400th anniversary of the death of Nicholas Copernicus, great Polish astronomer, the Kosciuszko Foundation announced.

Copernicus, often called the father of modern astronomy, originated the Copernican system of astronomy with the sun as the center of the solar system, which revolutionized man's conception of the universe.

Dr. Shapley and the committee will guide a nationwide program of scien-

tific demonstrations, academic exercises and lectures honoring Copernicus on May 24, the date of his death.

A meeting of tribute in Carnegie Hall, New York, with Dr. Shapley presiding, will climax the commemoration. Jan Ciechanowski, ambassador of the Republic of Poland to this country, will take part in the program.

The Kosciuszko Foundation, named in honor of the Polish patriot and American Revolutionary war hero, is sponsoring the Copernican Quadricentennial as one of its wartime endeavors to keep alight Poland's torch of knowledge, fired by that nation's contributions to science and intellectual freedom.

Science News Letter, March 27, 1943

CHEMISTRY

Potassium in Fertilizers Tested by Radioactivity

► RADIOACTIVITY is now being used to determine the amount of potassium in fertilizers and other mixtures. The new method may completely replace the old chemical analysis method, until now the only general method in use. This is a laborious task taking hours to complete. The radioactivity method requires but a relatively short time and is claimed to be accurate.

Radioactivity is a property possessed by certain substances, such as radium, of giving off spontaneously special rays or radiations that are invisible to the eye but which will pass through materials through which ordinary light will not pass. Potassium mixtures and compounds possess this property to a slight degree. In the new method the quantity of potassium present is determined by the intensity of the radioactivity of the mixture. The radioactivity is weak but is measurable by extremely sensitive modern physical instruments.

The new method is the result of work by two scientists, Dr. R. Bowling Barnes and Dr. D. J. Salley, of the American Cyanamid Company. A report on it has been published recently by the American Chemical Society.

In the new method an instrument known as the Geiger counter is used. It was developed to measure radioactivity. The sample of the mixture containing potassium is dissolved in water, with or without the assistance of an acid, and introduced into a special glass cell which surrounds the Geiger counter tube. The tiny impulses caused by the radioactive changes in the potassium atoms of the sample actuates the counting apparatus.

Science News Letter, March 27, 1943

CHEMISTRY

Plastic Lithographic Plates Now Used by Army

► PLASTIC lithographic printing plates, made from polyvinyl alcohol resin, are reported to be in use in the Army for printing colored maps and other military documents, and in mobile field printing units. Their use saves from three to eight times their weight in critical aluminum and zinc.

The development came about through the use of polyvinyl alcohol as a coating on zinc to improve the printing quality of the metal. It became apparent that the actual printing was from the plastic and not the metal, and that other material could as well be used for the base as zinc and aluminum.

In the new plate the base is paper impregnated with the polyvinyl alcohol resin which gives it the required strength and stability. It is waterproofed with a coating of another resin. Two sheets are then laminated to form the base, and the printing surface coated with the polyvinyl alcohol resin.

Creation of the printing image is the same as with metal. The resin plastic is sensitized with bichromate of ammonia. It is exposed to light, treated with the developing ink, developed in water and etched, and is then ready for use in the press.

The development of this plastic for lithograph printing plates was carried out in the laboratories of the Du Pont Company, and the plates are made by a Boston company. The Army at present has preempted the entire output, but it will be available at a later date to the printing trade it is expected.

Science News Letter, March 27, 1943

AGRICULTURE

More Nicotine Needed; May Grow New Tobacco Types

► SURPLUS tobacco will have to be used, or new types grown, to solve the estimated 300,000-pound shortage of nicotine needed this year for insecticides and for the nicotinic acid used to fortify white flour and treat pellagra.

One possibility is the growth of *Nicotiana rustica*, a species of tobacco not used for smoking in this country, which contains about twice as much nicotine as ordinary tobacco. This has long been grown experimentally in various parts of the country.

Science News Letter, March 27, 1943

ASTRONOMY

Mercury Appears

Planet will appear just after sunset. Venus now brightest of stars and planets; Saturn also shines nearby. Full moon heralds coming of Easter.

By JAMES STOKLEY

► OF ALL the five planets of the solar system that are visible to the naked eye, the one that is hardest to see is the innermost — Mercury — which revolves around the sun at a distance of 36,000,000 miles, or about 39% of the average distance of earth from the sun. Most of the time it is too nearly in line with the sun for us to observe. When it is farthest west of the sun, it appears in the east before sunrise; when it is farthest east, it remains in the west after sunset. But not all such "elongations" are equally favorable for bringing the planet into view. It happens that when an eastern elongation occurs in the spring time, it is highest in the evening sky. We have such an elongation on April 30.

Thus, on this evening, and for several evenings before and after, Mercury will appear low in the sky, directly west, just after the sun has gone from sight and as darkness is falling. Since it, too, will have set before darkness is complete, it is not shown on the maps. But there will be little difficulty in recognizing it because it is so bright.

Bright Planets Together

However, care must be taken not to confuse it with Venus, which will shine a short distance above it and even more brightly. Venus, indeed, is now the brightest star or planet and will have magnitude minus 3.5. Jupiter, in another part of the sky, comes next, with minus 1.7. Then ranks the dog star, Sirius, with minus 1.6, and Mercury comes fourth with minus 1. Saturn, which is near Venus, is fainter with plus 0.3 magnitude, still much brighter than most of the stars.

Venus will be visible in the evening western sky throughout April, as it has been since early this year. Thus, you will have a chance to get acquainted with her long before the end of the month. Then, about April 30, when you see that she has been joined by a fainter, but still very brilliant object below, you will know that the new one is Mercury.

On the maps are shown the appear-

ance of the skies at about 11 p.m., your war time, on April 1 and an hour earlier on the fifteenth. The planets are shown as they appear at the middle of the month, for Venus is moving rapidly. On the twenty-fourth it passes Saturn, and then, with the star Aldebaran, in Taurus the bull, nearby, they will form an interesting trio.

Leo, the Lion, Stands Out

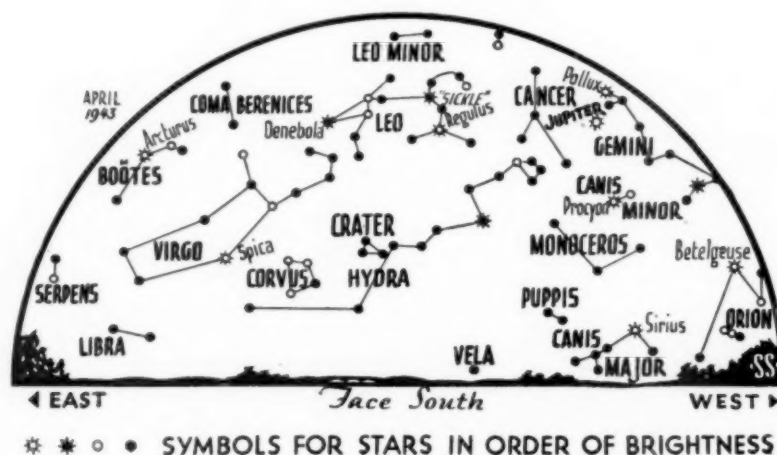
Though Orion and Canis Major are still visible, as they were during the winter, a different group of constellations have assumed a conspicuous position. High in the south is Leo, the lion, part of which is a smaller group called the sickle. Regulus marks the end of the handle. High in the west are Gemini, the twins. The two principal stars, Castor and Pollux, are joined by brilliant Jupiter. The great dipper—part of Ursa Major, the great bear—is high in the north, and upside down. The handle of the dipper points in an easterly direction. If you follow its curved line on to the south, you will come to Arcturus, in Bootes and then to Spica, in Virgo, the virgin.

Only one planet remains unaccounted for, and that is Mars. Just now it is very far away, and quite faint—of magnitude plus 1.2. It is low in the southeast at sunrise.

Some writers, who should have known better, have made the mistake of describing the appearance of the crescent moon with a star inside its horns. In the "Ancient Mariner," for example, Coleridge wrote of "the horned moon with one bright star within the nether tip." On the evening of April 9, if it is clear, you will be able to see the crescent moon with a star about as close as it can get. In the eastern part of the country there will be an occultation. That is, the moon will actually pass in front of, and "eclipse," the star Aldebaran, in Taurus, the bull. In the Rocky Mountain and Pacific states, the occultation will be over before sunset, but even there, on that evening, the star and crescent will be close.

Calculations made at the U. S. Naval Observatory in Washington, and published in the astronomer's bible, the "American Ephemeris," give the times of occultations for Washington and three other locations. One is in southern California, where this will not be seen. For Washington, the star will hide at 10:56 p.m., EWT. At a point in western Massachusetts, it will vanish at 10:50 p.m., EWT. For both of these locations, the reappearance will not come before the moon has set. But the last location, in southern Illinois, will watch the star covered by the moon at 9:55 p.m., CWT, and will see it emerge at 10:48 p.m., CWT.

The moon will appear in a crescent phase because of the fact that only four days before it will have been almost in





line with the sun. Even on the ninth, most of the sunlit half of the moon will be turned away from us, and we will only see a narrow sliver that forms the crescent. Aldebaran will be occulted by the dark edge of the moon, though it may not be entirely dark. Often when the moon is a crescent, it is possible to see faintly its complete circle. This is sometimes called "the old moon in the new moon's arms." The bright crescent is illuminated directly by sunlight. The dark part is lighted by earth-shine. This is light from the sun that is reflected by the earth, and then reflected by the moon back to us again. To a person on the moon, the earth would undergo phases like those which the moon has for us. When we see a new moon, they would see a full earth, and it would be about 40 times as bright as we see the full moon.

Thus, the moon's dark edge will hide the star, and it will vanish instantaneously, because there is no atmosphere around the moon to cause a gradual diminution of its light. And out in the midwest, where the end of the occultation will be visible, the reappearance, from behind the sunlit edge, will be equally sudden. Such occultations, not only of bright stars, which are rather rare, but of fainter ones, which occur almost nightly, are regularly watched by astronomers. They can be timed very accurately, and permit them to check accurately their predictions of the moon's motion.

Celestial Time Table for April

April	EWT	
4	5:53 p.m.	New moon.
7	6:54 a.m.	Moon passes Venus.
8	8:36 p.m.	Moon passes Saturn.
9	10:56 p.m.	Occultation of Aldebaran (not visible in far west).
12	1:28 a.m.	Moon passes Jupiter.
	11:04 a.m.	Moon in first quarter.
	6:00 p.m.	Moon farthest, distance 251,100 miles.
20	7:11 a.m.	Full moon*.
21	early a.m.	Meteors of Lyrid shower visible.

24	midnight	Venus passes Saturn.
25	noon	Moon nearest, distance 229,500 miles.
27	3:51 a.m.	Moon in last quarter.
29	12:33 p.m.	Moon passes Mars.
30	5:00 a.m.	Mercury farthest east of sun, visible in western evening sky for a few days around this date.

*The full moon on April 20 is the Paschal full moon, that is, the first after the vernal equinox, which occurred on March 21. Easter is thus on the following Sunday.
Subtract one hour for CWT, two hours for MWT, and three for PWT.

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ENGINEERING

Planes Cast on Plastic

➤ A NEW plastic to make dies, jigs and forming blocks that will speed up plane production has been developed in the Columbia University chemical engineering laboratories, Prof. James M. Church announced to the Columbia Scholastic Press Association.

The tough ethyl cellulose plastic, produced in cooperation with plastic makers and plane manufacturers, replaces strategic materials. It can be melted and cast into shapes without the use of pressure somewhat the same as metal, but at much lower temperatures and with more exactness of mold dimensions, Prof. Church asserted.

It weighs only a fifth as much as steel yet has a high impact strength, hardness and durability that makes it practical to be cast into forms upon which metal plane parts are fabricated.

The new plastic, known as Thermo-Cast, opens up the possibility that the plane of tomorrow can be stamped out in very large sections on plastic forms and with the use of plastic punches, Prof. Church stated, much the same as the auto body has been made all in one piece.

Mass production of warplanes by using methods of the automotive industry has encountered some difficulties.

PLANT PATHOLOGY

Plant Disease Fighters Recommend Seed Treating

➤ MORE INTENSIVE warfare on a little-noticed sector of the home front—defense of fields and gardens against plant diseases—was called for by the War Committee of the American Phytopathological Society. The committee offered a ten-point schedule of recommendations, stressing especially the need for treating seed before planting, to prevent the development of fungi that kill vast numbers of seedlings before they can even get fairly started.

Of particular interest to Victory Gardeners is the suggestion that they disinfest their own seed, to make the present limited supplies go farther. It was also recommended that seed growers and dealers give their seed this protective treatment before packaging, or at least print treatment directions on each package for the guidance of the Victory Gardener.

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"Not only were some of the older methods for metal fabrication inadequate for aircraft production," Prof. Church declared, "but the metal used in the tools for forming these metal parts was found to be critically needed for other war uses and also inefficient for the production methods of the aircraft industry."

Metal is not only conserved by using the new plastic, but many man-hours are saved because machining and grinding operations have been eliminated.

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● RADIO

Saturday, April 3, 1:30 p.m., EWT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Edwin G. Boring, professor of psychology at Harvard University, will discuss "Psychology for the Fighting Man."

Monday, March 29, 9:15 a.m., EWT; 2:30 p.m., CWT; 9:30 a.m., MWT; and 1:30 p.m., PWT

Science at Work, School of the Air of the Americas over the Columbia Broadcasting System, presented in cooperation with the National Education Association, Science Service and Science Clubs of America.

"Freedom from Fears" will be the subject of the program.

AERONAUTICS—RESOURCES

More Fuel Is Needed

Huge expansion of cargo plane fleet poses new problem of fuel supply. Air transport is aiding the African drive.

➤ **AVIATION FUEL**, the priority passenger on every cargo plane, must be produced in much larger quantities to keep aloft our growing fleets of military transports, it is revealed by a study issued by the Standard Oil Company.

About 3,300,000 gallons of 100-octane fuel a day will be required to fly the 1,200 cargo planes called for by a recent contract, assuming that they fly a third of the time.

To maintain such a fleet of planes, if they were the most efficient heavy type for long hauls, would require a substantial increase in the nation's 100-octane capacity, the report states.

Four to five gallons of aviation lubricants will also be required for every hundred gallons of gasoline consumed. The huge demands may make it necessary to restrict civilian consumption of premium grade motor oils. In normal times it would take more than a year to expand the complicated processing facilities for these aviation lubricants.

"Whether the industry can supply the fuel and lubricants to put into the air such a cargo fleet as is now being dis-

cussed depends on how rapidly the steel and other critical materials that must be allocated among various programs of strategic importance can be made available for 100-octane plant construction," Standard Oil officials warn.

The cargo plane's thirst for fuel is revealed by statistics showing that more fuel must be carried than cargo except on short runs and with frequent refueling. For heavy types of planes, like the Mars, the proportionate fuel demand is lowered.

Every cargo plane now in operation on overseas lanes requires more tankers to keep it in service than it replaces in freight ships, the report states. But planes are now actually delivering military supplies to far corners of the earth because of their speed and because their valuable cargoes can be delivered directly to troops inaccessible by ship.

Planes from the United States, for example, have been flying replacement parts for tanks and planes all the way to Africa to help maintain the drive of the United Nations.

Science News Letter, March 27, 1943

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Florida Dunes

➤ **SAND DUNES** are very much alike wherever you find them. Young soldiers and aviation cadets in Florida, whose thousands have largely replaced that state's normal peacetime population of tourists and vacationers, have doubtless noticed that the sand dunes along both ocean and gulf coasts are in a general way very much like other dunes they have seen along the seaboard farther north, or on the Pacific coast, or on the southern and eastern shores of Lake Michigan.

First there is bare, loose sand; then a zone of sparse, weakly-rooted plants eking out a hard existence; above this, one or more ridges bound with increasing firmness by the tough roots of perennial grasses. Still beyond comes the area of the stabilized dunes, with long-established plant populations of substantial bushes and various kinds of full-sized trees.

Closer examination, however, will show decided differences in detail underlying the general similarities. The same jobs of pioneering, sand-binding and stabilization are done, but there are different plants doing them.

A comprehensive and most readable study of the vegetation of Florida dunes has just been brought out by Prof. Herman Kurz of the State College for Women at Tallahassee. In text and diagrammatic illustration he tells the story of the plants that make the shifting sands stand still. (*Florida Dunes and Scrub, Vegetation and Ecology; State Geol. Surv., Tallahassee, \$1.*)

A stroll from the water's edge takes the observant student of nature first across the weakly-held pioneer-plant zone where beach morning glory and the fleshy sea-rocket are the most con-

spicuous plants. In the zone of sand-binding grasses, sea-oats is by far the dominant plant, its waving monotony punctuated towards the inland margin by stiff-stemmed yuccas.

The stabilized zone of trees is the most complex part of the dune plant world. Most constant throughout are palmettos, usually sprawling undergrowth bushes, but sometimes tall tree forms also. Oaks, of Southern species, abound; often (though not always) pines as well. There are one or two kinds of holly, with smooth-edged leaves that fall off in winter.

Highest vegetational development, corresponding to the beech-maple "climax" community of the famous Lake Michigan dunes, is reached when the large-flowered magnolia appears among the oaks, like a queen who finds that her hardy pioneer fighters have made the frontier safe for her regal presence.

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CHEMISTRY

Dr. Elvehjem Wins Medal For Work in Nutrition

► THE WILLARD GIBBS Medal, highest award of international scope which the American Chemical Society's Chicago Section can bestow, has been given to Dr. Conrad Arnold Elvehjem, professor of biochemistry at the University of Wisconsin.

A long record of original research in chemistry brought Dr. Elvehjem the honor. In 1928 he received wide recognition with his associates for work involving trace elements in nutrition. They discovered that copper is essential to the formation of hemoglobin, the oxygen-carrying red stuff of the blood.

Later their studies revealed the place of a number of metals in nutrition, such as iron, manganese and aluminum.

While at Cambridge Dr. Elvehjem conducted studies on tissue respiration which have since been applied to the study of vitamin functions.

Use of nicotinic acid in prevention and cure of pellagra developed from Dr. Elvehjem's greatest discovery: the role of nicotinic acid in animal nutrition.

He is now conducting studies on the newer members of the growing family of B vitamins.

For these and other researches, Dr. Elvehjem will formally be presented with the medal at a meeting of the Chicago Section of the American Chemical Society on May 20.

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INVENTION

Device Saves Ammunition By Reducing Gun "Climb"

► TERRIBLE ammunition-waster is the tendency of submachine ("Tommy") guns and automatic rifles to "climb;" it is difficult even for experienced gunners to keep their muzzles at proper elevation when full-automatic fire is on. To overcome this tendency, Eugene G. Reising, well-known gunmaker of Hartford,

Conn., has developed a simple muzzle attachment on which he has received patent 2,313,669.

It is tubular in general outline, with internal diameter appreciably greater than the weapon's bore. Through its upper side are cut several transverse slots, and a cuplike lip extends across the lower side of the outer end. Effect of the blast, reacting against these, is to push the muzzle down, neutralizing the climbing tendency.

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HERE'S HOW TO ENLIST YOUR BINOCULARS

The Navy needs every binocular it can get. If you have a Bausch & Lomb 6 x 30 or 7 x 50 binocular and will turn it over to the Navy for the duration, pack it carefully and ship to the Naval Observatory, Washington, D. C., or deliver to the nearest naval district headquarters. An identification tag bearing your name and address should be fastened securely to each instrument. Accepted binoculars will be acknowledged with a fee of one dollar and will be returned to you after the war if still in use.

The Navy is not authorized to accept gifts or free loans. Therefore, the binoculars are purchased for \$1.00 and if they are available after the war they will be returned to the owner, in which case the \$1.00 will constitute rental and appreciation charges. Commanding officers of naval vessels are requested to notify you of the ship aboard which your binoculars are in service.

They're in the Navy Now

ON the bridges and look-out stations of American ships, brave men stand alert, searching the horizon—on guard against enemy attack. You can help these men, and thus help to hasten the day of Victory, by sending them your binoculars for the duration.

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PUBLIC HEALTH

Survey of Physicians

A first step is taken toward solving the problem of how many physicians can be taken by armed forces and still care for civilian health.

► A FIRST STEP toward solving the problem of estimating how many physicians can be taken by the armed forces and still leave enough in a community to satisfy present demands for physicians' services is now available through a study of the Washington, D. C., Baltimore and Maryland situation.

The study, by Dr. Antonio Ciocco and Isidore Altman, of the National Institute of Health, U. S. Public Health Service, is reported in the *Journal of the American Medical Association* (Feb. 13).

From information furnished by about two-thirds of the physicians of the two cities and one state for one week in early fall, 1942, the statisticians were able to determine the present number of patients seen in one week by doctors of various age groups, male and female, Negro and white, and in general practice or specialties. Among many significant facts, the study shows the following:

General practitioners under 45 years of age, the group the armed forces are drawing on, have a patient load 25% to 50% greater than those between 45 and 64 years and more than twice as large as that of doctors 65 years and older.

This age difference is important because, as the statisticians point out, "in a community containing two physicians, one 35 and the other 65 years of age, one could maintain that the removal of the younger man will mean the loss of not one-half but of two-thirds of the physicians."

General practitioners who spend eight

hours in their office daily see on the average 140 patients weekly. Those who spend nine hours can be assumed to see an average of 158 patients weekly. On the basis of the figures, a weekly average patient load of 140 would require a ratio of one physician to 960 persons in Washington, D. C.; one to 970 persons in Baltimore; and one to 1,135 in Maryland.

A weekly average patient load of 140 for Washington, D. C., means an increase of about 22% over the present patient load or, considering the ages of the remaining general practitioners, since some younger doctors have already been taken into the armed forces, an increase of about 26%.

If an average weekly patient load of 160 is considered as a maximum, giving a ratio of one physician to 1,060 persons in the nation's capital, the increase over the present patient load, taking into account the ages of the remaining general practitioners, becomes 48%.

The present average patient load, the statisticians point out, already represents an increase of perhaps 25% over that of 1940. Increasing the patient load of a group of physicians by 40% over that of the present actually increases it by about 75% over that of 1940.

"Therefore, the pertinent question to be asked," they state, "before accepting any proposed value of the maximum patient load, is whether or not the remaining physicians are able to sustain the added burden."

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GENERAL SCIENCE

Dr. Isaiah Bowman of Johns Hopkins Heads AAAS

► DR. ISAIAH BOWMAN, geographer and president of the Johns Hopkins University, has been elected president of the American Association for the Advancement of Science.

Due to the cancellation of the New York meeting, the election by the AAAS council was conducted by mail ballot.

Dr. Bowman succeeds as president Dr. Arthur Compton, University of Chicago Nobel, who as retiring president is scheduled to deliver the principal address of the annual meeting of this nation's largest general science organization if war conditions allow.

One of the nation's leading geographers, Dr. Bowman before he assumed the presidency of Johns Hopkins was head of the American Geographical Society and chairman of the National Research Council.

Science News Letter, March 27, 1943

GENERAL SCIENCE

Standards Will Help South American Trade

► INTER-AMERICAN standardization of industrial products will be promoted by a new department in the American Standards Association because of increased trade and closer cooperation with our South American neighbors.

Data on development and use of standards will be exchanged with government, industrial and technical groups. War requirements have speeded plans to provide Latin American countries with Spanish and Portuguese translations of standards which may be helpful in developing their industries.

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Science News Letter, March 27, 1943

✿ **AN IMPROVED THROAT** microphone worn around the neck over the throat box is now available for use in factories and other noisy places, doing away with shouting. The device weighs only two ounces. Words spoken by the wearer, even in a low tone, are picked up and may be amplified and transmitted through a public address system.

Science News Letter, March 27, 1943

✿ **THE RECEPTACLE** contained in a newly patented umbrella handle is designed to hold a pair of rubbers or other articles.

Science News Letter, March 27, 1943

✿ **THE HALF BILLION** fence posts replaced by American farmers annually can now be protected from termites and decay by the trough method, a simple soaking process with chromated zinc chloride. This replaces the former treatment procedure employed by most farmers which used old inner tubes as part of the equipment.

Science News Letter, March 27, 1943

✿ **AN IMPROVED** method of sealing the ends of pyrex tubes will now protect chemists from breakage in the laboratory. By a procedure of thoroughly annealing the seals, tubes were found to withstand over 2,500 pounds pressure per square inch, a force far greater than that generated by most chemical reactions.

Science News Letter, March 27, 1943

✿ **NEW RUBBER** insulated bushings capable of absorbing vibration and shock, and of taking torsional and radial movement without lubrication, require only 20 per cent as much synthetic or natural rubber as that used in previous conventional designs, the manufacturer states. Thinner walls are used, but this seems to lengthen the life and increase the efficiency of the assembly.

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✿ **A MAGNETIC RIVETING** device, shown in the photograph, speeds certain riveting operations in warplane construction. The device magnetizes a bucking bar which is pulled through narrow channels by a wire, permitting a new type of assembly impossible under old riveting methods in which a bucker, teaming up with the riveter, holds a bar in place manually.

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If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 149.

ENGINEERING

Copper-Covered Wire Good For High-Frequency Lines

➤ **IMPROVED** design of high-frequency telephone wires and other wartime communication lines, effecting a saving of strategic copper, may be possible from research work by Dr. B. R. Teare, Jr., and his assistant, Mrs. Josephine R. Webb, of the Carnegie Institute of Technology.

Copper-covered steel wire is just about as good as solid copper wire except at the lowest frequencies, the scientists discovered. Wide use is being made of a copper covering welded to a steel core because the great strength of this wire permits poles for the wires to be spaced far apart and saves large quantities of copper.

Resistance of copper-covered steel at ordinary power frequencies was known, but performance in the increasingly important range up to 150,000 cycles had not been charted previously.

By using the formulas announced by Dr. Teare and Mrs. Webb, communication systems can be designed to fit both the material available and wartime requirements without the delay of testing the conductor.

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ENGINEERING

No Engine Changes Needed To Use Low Anti-Knock Gas

➤ **NO MAJOR ENGINE** changes will be necessary in buses, trucks and other commercial carriers because of the reduced anti-knock value of gasoline. Only if octane rating falls below 65 is performance likely to be noticeably altered.

Even fuel consumption and power output is very little affected if spark timing is properly retarded, D. P. Brenz, H. H. Maxfield and A. B. Culbertson of the Shell Oil Company told the meeting of the Society of Automotive Engineers.

Experiments show that closer maintenance will probably be necessary, the engineers warn. Results are likely to vary with cars of the same model, so that optimum spark timing should be determined for each engine.

Although tests showed that about a 5% loss in power could be expected, truck drivers on actual road runs reported that they could detect no difference in performance between gasolines of 65 and 72 octane number.

Carburetor adjustment does not appear to be worth while, the engineers report, judging from the results of their tests. Such enrichment of the gasoline mixture apparently causes much greater relative loss in power and economy than is suffered from retarded spark timing.

Passenger cars, as well as the commercial vehicles, can just as easily be adapted to the lowered anti-knock quality of gasoline, earlier investigations revealed. Most motorists have found that they can avoid knocking by merely easing up on the accelerators. At the same time, this extends the life of tires and increases mileage obtained from the gasoline ration.

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Certain bacteria in sea water induce calcium to combine with carbon dioxide, thus causing a finely divided limestone to settle out.

First Glances at New Books

► **VACATION** driving being now in the difficult-to-impossible category, trail-hiking will doubtless appeal to increasing numbers. This gives timeliness to the appearance of the second edition of the *Appalachian Trail Conference's GUIDE TO THE APPALACHIAN TRAIL IN THE SOUTHERN APPALACHIANS* (\$1.75). Compact, mile-by-mile text descriptions and plenty of folded maps make this manual a "must" for even the lightest pack.

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► **A HISTORY** of aeronautics in the United States is the *FIRST CENTURY OF FLIGHT IN AMERICA*, by Jeremiah Milbank, Jr., (Princeton Univ. Press, \$2.75). The first survey of this subject covers the period from 1784 to the present day. It is well illustrated and documented, and should be of interest to technicians, historians, as well as laymen.

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► **REVIEW** and predictions on current science by the editor, John D. Ratcliff, preface the *SCIENCE YEAR BOOK OF 1943* (Doubleday, Doran & Co., \$2.50). Written in popular vein, the volume contains some of the best science articles published last year. Selections are limited to the fields of medicine, aviation, natural history and agriculture.

Science News Letter, March 27, 1943

► **HOW SINEWS** of victory are produced from "flowing gold" is related in *THE AMAZING PETROLEUM INDUSTRY* by V. A. Kalichevsky (Reinhold Publishing Corp., \$2.25). After explaining the nature of oil, the author traces its journey from deep in the earth to the myriad of completed products and by-products. Technical details are omitted but the reader will find an elementary knowledge of chemistry helpful.

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► **FERN-LOVERS** and botanists generally will welcome *FERNS AND FERN ALLIES OF LOUISIANA*, by Clair A. Brown and Donovan S. Correll (La. State Univ. Press, \$3). Brief textual descriptions and halftone illustrations (from herbarium specimens) facilitate identification of the many interesting Southern fern species.

Science News Letter, March 27, 1943

► **MORE** than a score of Army occupations require the operational skills ex-

plained in *FUNDAMENTAL SHOP TRAINING* by John T. Shuman, Capt. Bailey Wright and James Ritchey (American Technical Society, \$2). It is readable preinduction material on elementary shopwork.

Science News Letter, March 27, 1943

► **BUILD IT YOURSELF**, by Michael Rothman, is a good woodworking manual with working drawings for many pieces of easy-to-make home furniture that can be constructed at home by the amateur. Common hand tools are described and illustrated. It will prove interesting for the man following a woodworking hobby. (Greenberg, \$1.75.)

Science News Letter, March 27, 1943

► **REHABILITATION** and war surgery, two most timely topics, make up a large section of the autobiography Dr. Fred H. Albee, one of the world's great orthopedic surgeons, has written, *A SURGEON'S FIGHT TO REBUILD MEN* (Dutton, \$3.50). The author's life has been full of drama as well as service and he recounts his experiences and the technical details of orthopedic surgery in a clear, vivid style. The reader will not want to skip a word of this book which furnishes so much valuable background information for pressing problems war has again brought.

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• Just Off the Press •

AIRCRAFT PROPELLER HANDBOOK—Karl Hansson Falk—Ronald Press, 146 p., illus., \$4.50. Revised ed.

THE AMAZING PETROLEUM INDUSTRY—V. A. Kalichevsky—Reinhold, 234 p., \$2.25.
ANALYTIC GEOMETRY—Edward S. Smith, Meyer Salkover and Howard K. Justice—Wiley, 298 p., illus., \$2.50.

BIRDS FROM THE GULF LOWLANDS OF SOUTHERN MEXICO—Pierce Brodtkorb—Univ. of Michigan Press—88 p., 1 map, 75c. (Miscellaneous Publications Museum of Zoology, University of Michigan, No. 55)

FERNS AND FERN ALLIES OF LOUISIANA—Clair A. Brown and Donovan S. Correll—Louisiana State Univ. Press., 186 p., illus., \$3.

THE FIRST CENTURY OF FLIGHT IN AMERICA—Jeremiah Milbank, Jr.—Princeton Univ. Press, 248 p., illus., \$2.75.

GEOMETRY IN AERONAUTICS: Establishing a Fix Interception Wind Drift Radius of Action—John R. Clark and Roland R. Smith—World Book Co., 16 p., illus., 10c. (A reprint of a new chapter from Modern-School Geometry, rev.)

HOW TO SOLVE PROBLEMS IN QUALITATIVE ANALYSIS—Joseph A. Babor and J. Kenneth W. Macalpine—Crowell—93 p., illus., 75c. New ed.

AN INTRODUCTION TO BIOPHYSICS—Otto Stuhlman—Wiley, 375 p., illus., \$4. (Textbook for mature college students which explains "the application of physics to biological problems")

MARINE ELECTRIC POWER—Q. B. Newman—Simmons-Boardman, 238 p., illus., \$2.50 2d. ed.

MONOGRAPH OF THE WEST INDIAN BEETLES OF THE FAMILY STAPHYLINIDAE—Richard E. Blackwelder—Govt. Print. Off., 658 p., \$1. (Smithsonian Institution United States National Museum bulletin 182)

NATIONAL FARM CHEMURGIC COUNCIL BULLETIN: New Fields for American Agriculture—National Farm Chemurgic

Council, 53 p., illus., 50c. (Papers Delivered in 1941 and 1942 before the Annual Meetings of the National Farm Chemurgic Council and Concerned with Large, New Cash Crops which Should be Grown by American Farmers).

NATIONAL RESOURCES DEVELOPMENT REPORT FOR 1943: Part I. Post-war Plan and Program—National Resources Planning Board—Govt. Print. Off., 81 p., 25c. A preview by government officials of a better world after the war, including the putting into practice of a new bill of rights.

100 MEAT SAVING RECIPES—Ann Roe Robbins—Crowell, 106 p., \$1. A welcome addition to cookbooks, now that meat rationing is here.

QUESTIONS AND ANSWERS FOR MARINE ENGINEERS—Compiled by H. C. Dinger—Simmons-Boardman, 97 p., illus., \$1. Book V—Powering, Fuel Economy, Propulsion, Propellers and Shafting.

SCIENCE YEAR BOOK OF 1943—John D. Ratcliff—Doubleday, Doran, 286 p., \$2.50.

THE SU SITE EXCAVATIONS AT A MOGOL-LON VILLAGE WESTERN NEW MEXICO: Second Season 1941—Paul S. Martin—Field Museum Chicago, 271 p., illus., \$2. (Anthropological Series Field Museum of Natural History, Volume 32, No. 2, Feb. 24, 1943. Publication 526)

TAXONOMIC AND GEOGRAPHIC COMMENTS ON GUATEMALAN SALAMANDERS OF THE GENUS OEDIPUS—L. C. Stuart—Univ. of Michigan Press, 34 p., 2 plates, 1 map, 35c. (Miscellaneous Publications Museum of Zoology, University of Michigan, No. 56)

A WARTIME GUIDANCE PROGRAM FOR YOUR SCHOOL—Alfred J. Cardall—Science Research Associates, 104 p., \$1.

WHEAT IN THE THIRD WAR YEAR MAJOR DEVELOPMENTS, 1941-42—M. K. Bennett, Helen C. Farnsworth and Rosamond H. Peirce—Stanford Univ., \$1. (Wheat Studies, Vol. XIX, No. 3, Dec. 1942)